

Pharmacognosy Department

Pharmacognosy-2 Labs

Seeds & Fruits

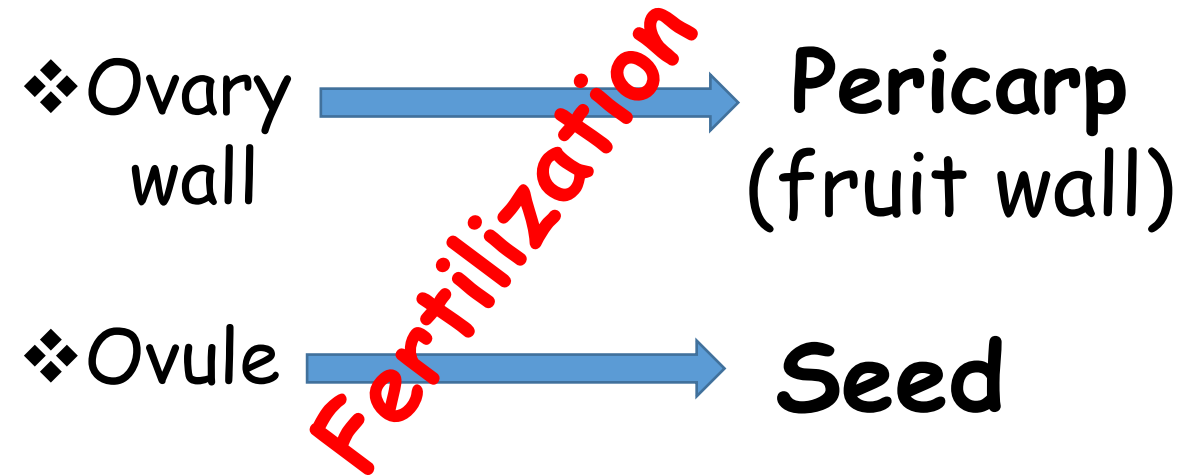
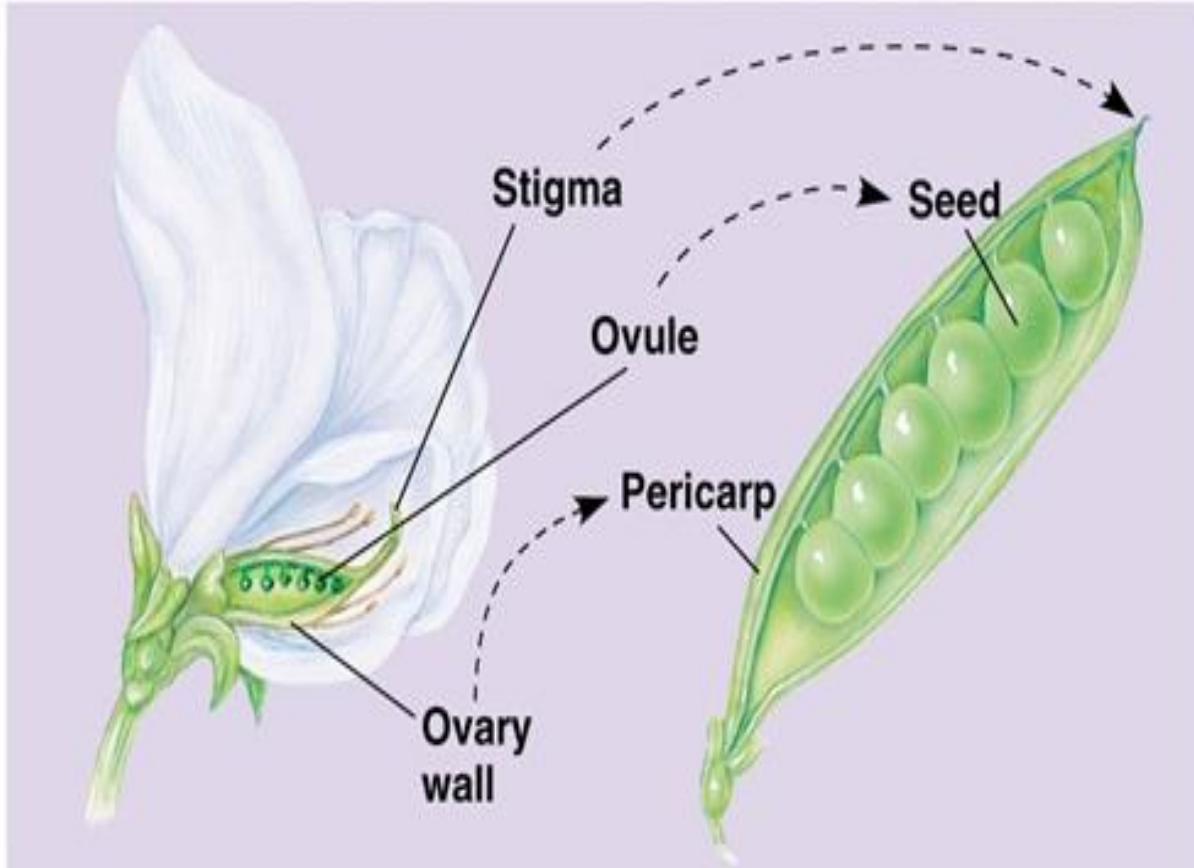
I- Seeds

- ✓ Introduction
- ✓ Linseed

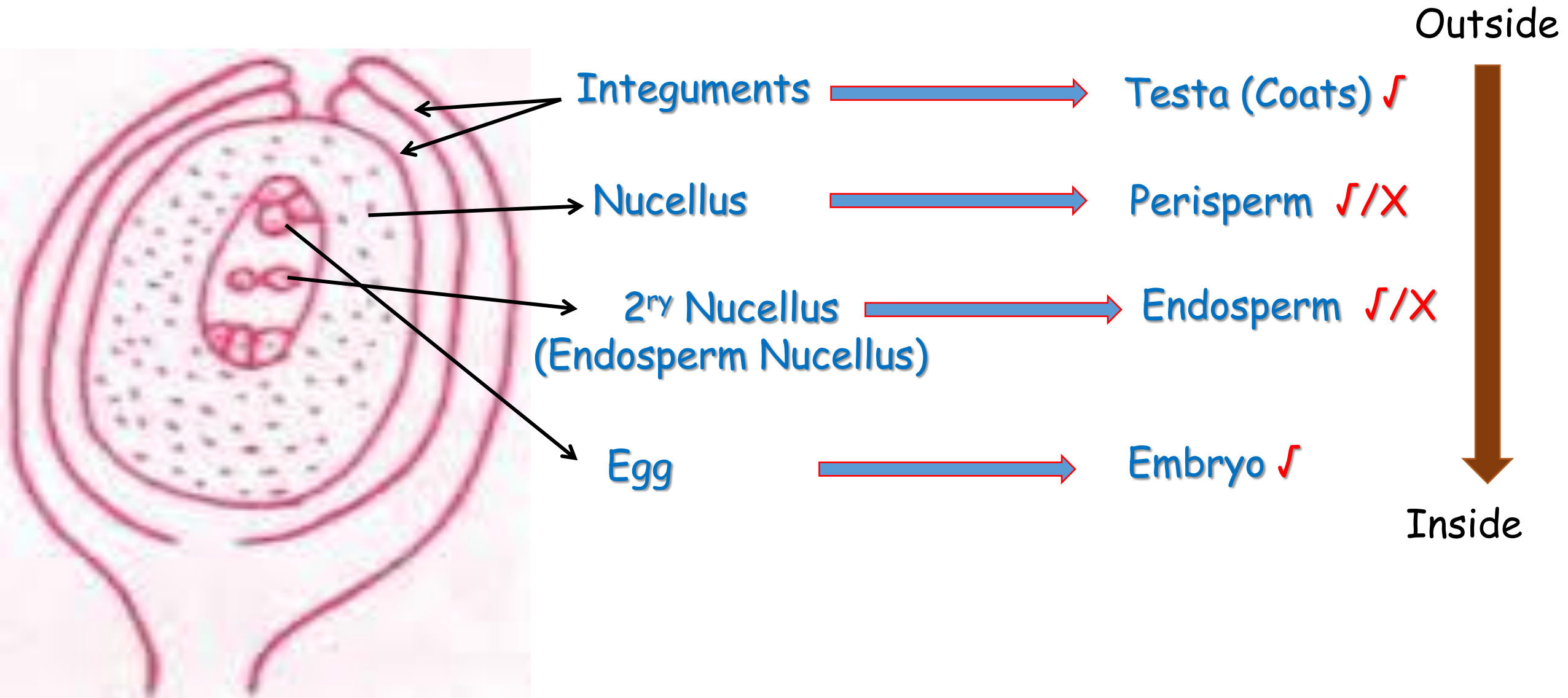
➤ Seed

is a fertilized ovule, which contains an embryo.

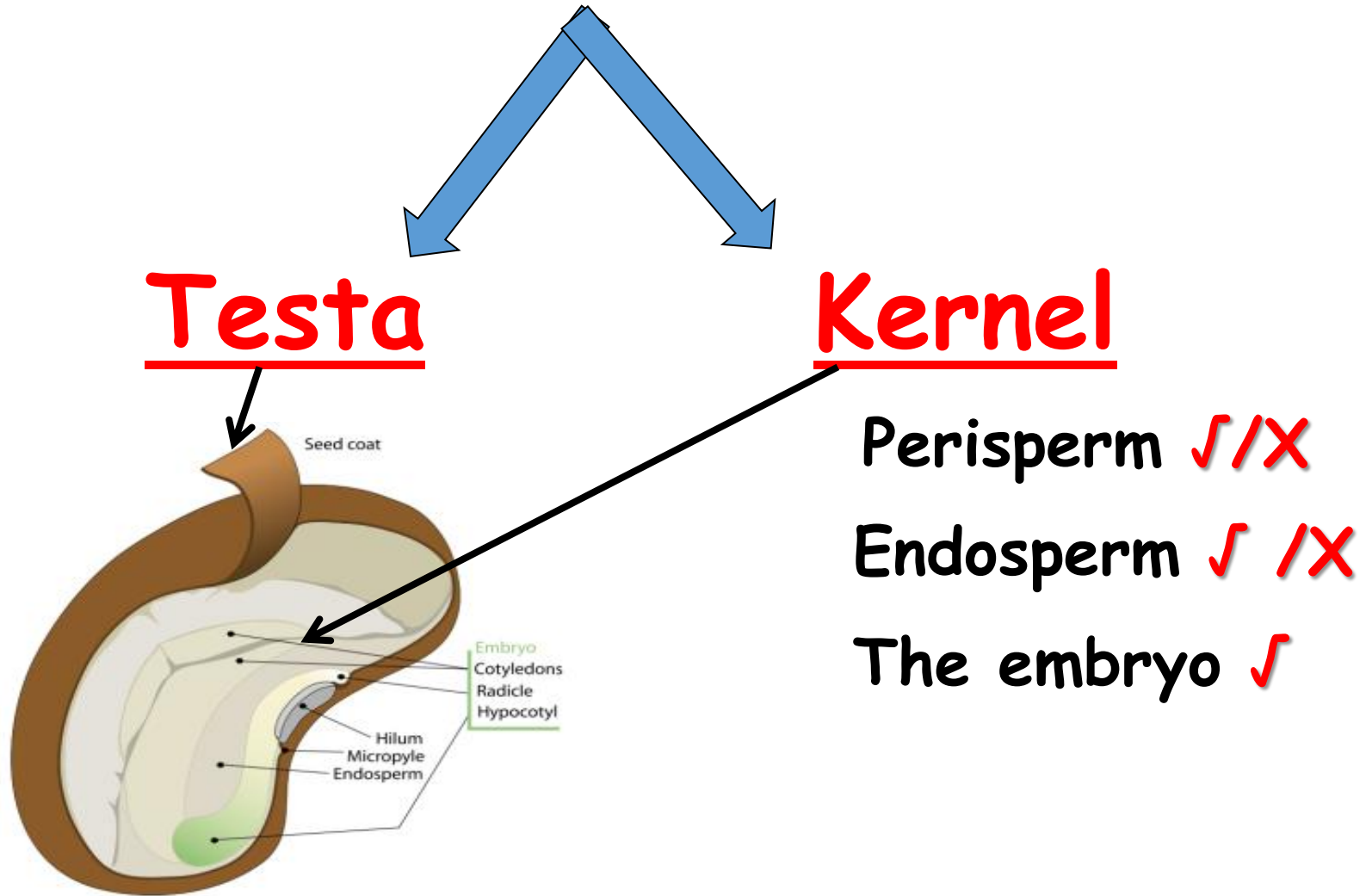
is a mature fertilized integumented (coated) ovule.



➤ After fertilization of the Ovule



A typical seed consists of



➤ Types of ovules:

➤ Atropous

➤ Campylotropous

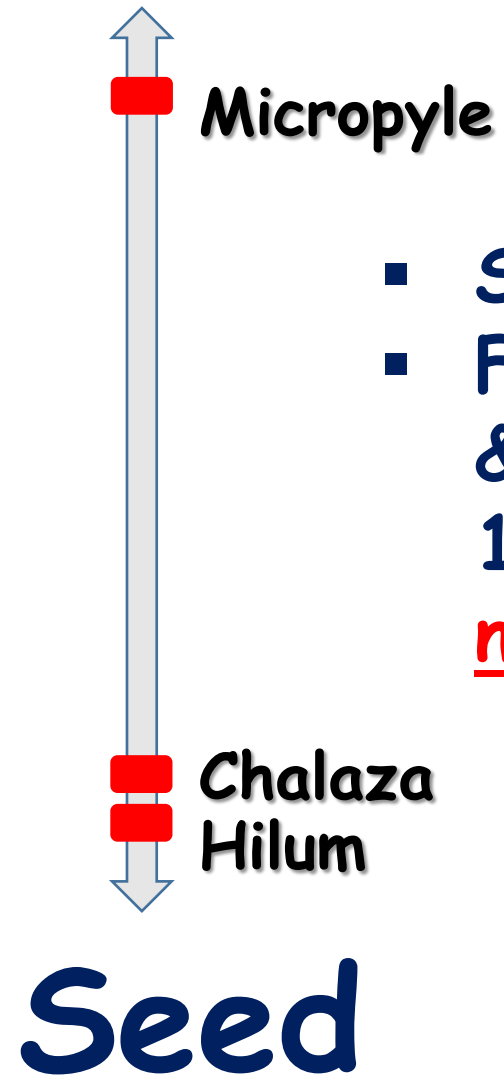
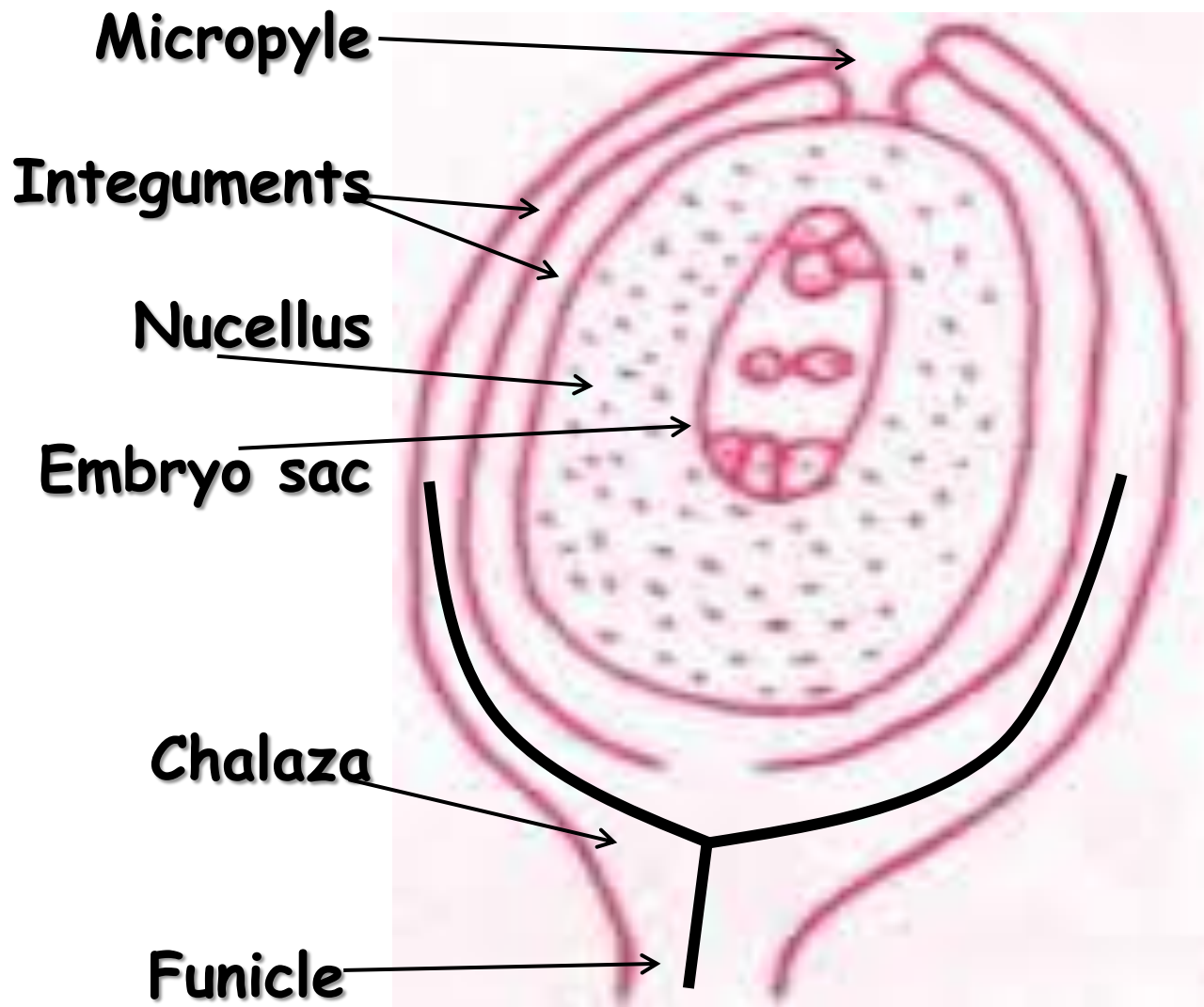
No raphe

➤ Anatropous

➤ Amphitropous

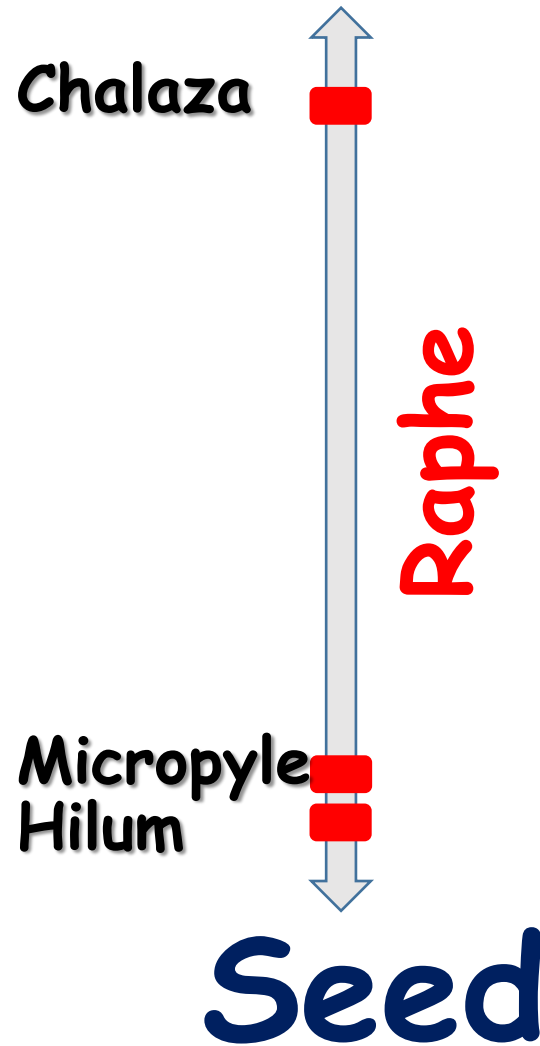
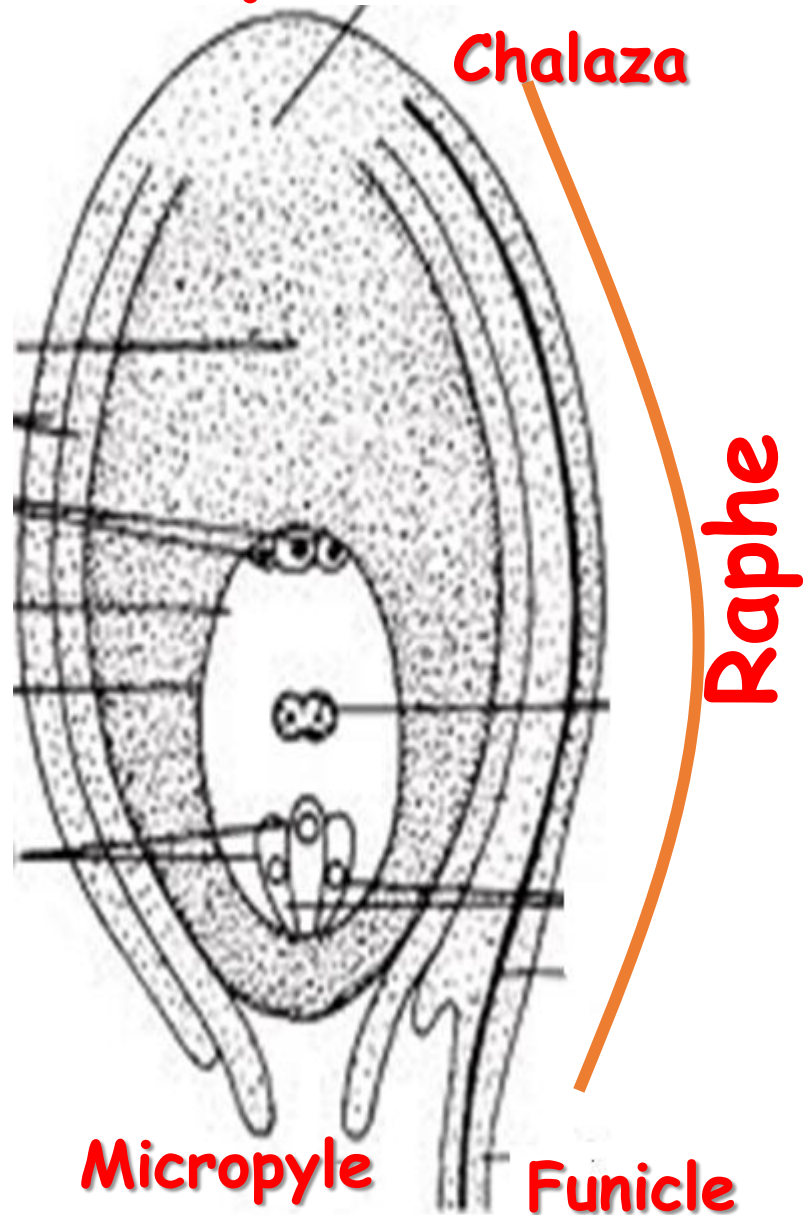
raphe

➤ Atropous ovule



- Straight ovule
- Funicle, chalaza & micropyle on 1 straight line, no raphe

➤ Anatropous ovule



- Ovule inverted
- Micropyle adjacent to hilum
- Chalaza at distal end
- Raphe runs from one end to the other

Linseed

بذر الكتان



- **Origin:** The dried ripe seeds of *Linum usitatisimum*
Family Linaceae.

Condition

dried and ripe

Color

Reddish brown

Odor

Odorless

Taste

Oily mucilagenous



Obliquely pointed
end

Shape

Flattened ovoid

Broad rounded
end

➤ Surface

Smooth, brown, shiny or glossy, minutely pitted



➤ Hilum & Micropyle

In a small depression near the pointed end

➤ Raphé

Distinct, as yellowish line, lining half the circumference of the seed

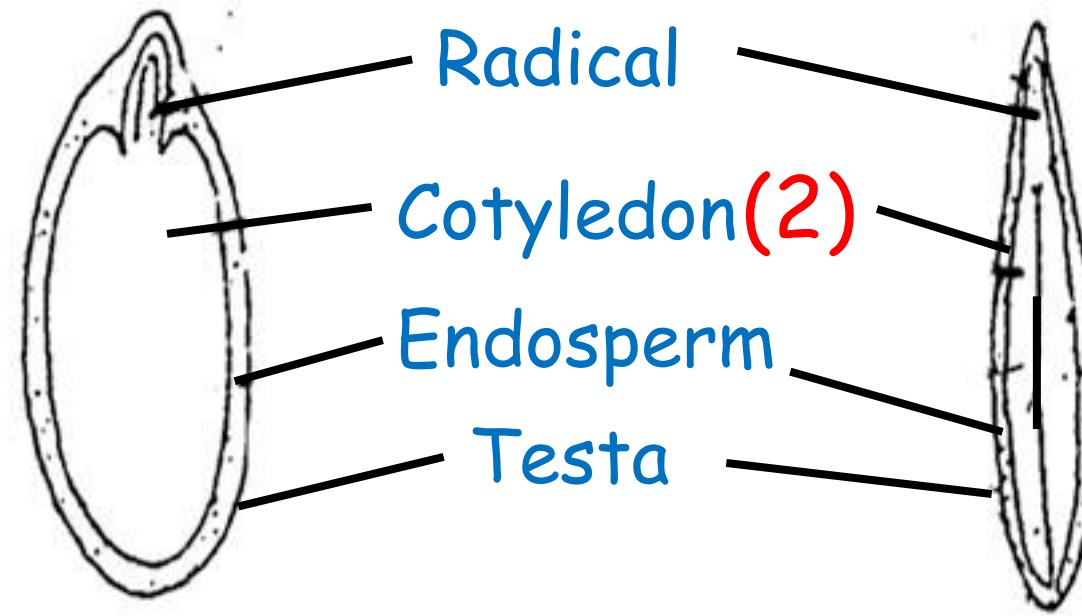
➤ Outgrowth

Nil

➤ Texture & thickness

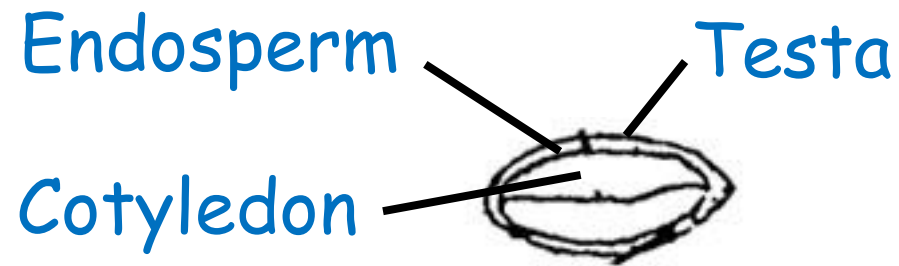
Thin and brittle





L-Cut // Flat surface

L-Cut \perp Flat surface

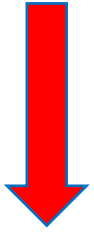


T-Cut

➤ **Perisperm** XXX

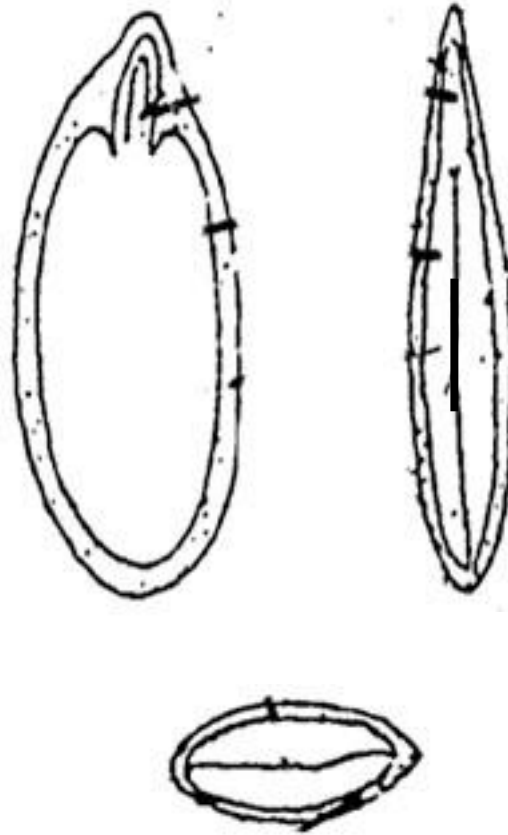
➤ **Endosperm** √√√

Narrow, yellowish, fleshy



➤ **Kind**

Albuminous



Embryo

➤ **Position**

Filling the whole cavity

➤ **Cotyledons**

Dicot.

➤ **Form**

Straight

➤ **Radical**

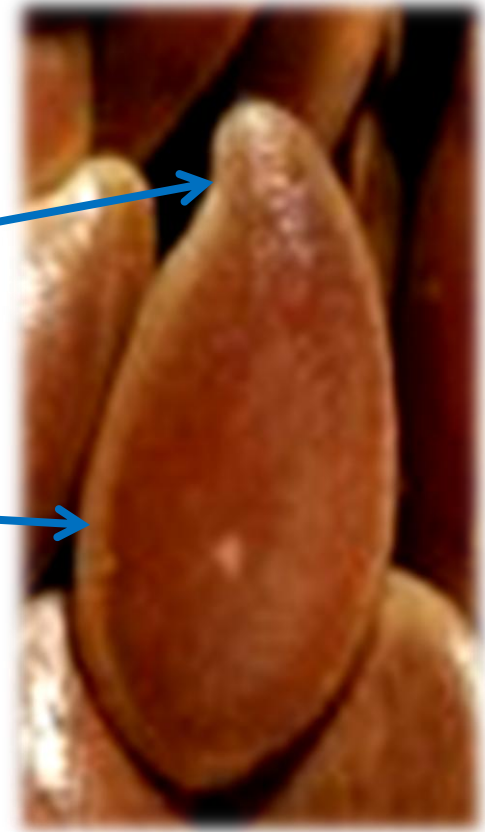
Small, apical, facing
the micropyle

Type of Ovule ???

Anatropous

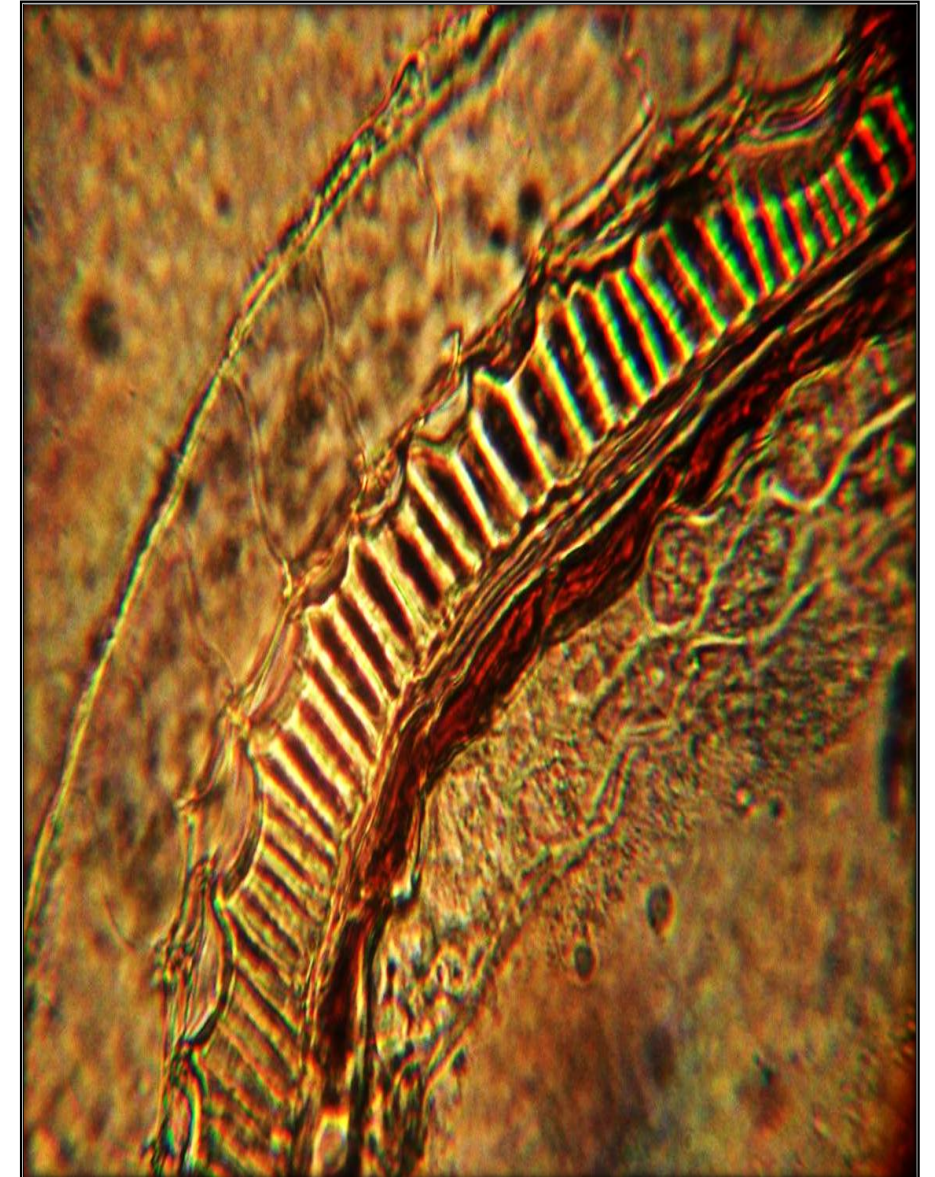
H. & M.

Raphé

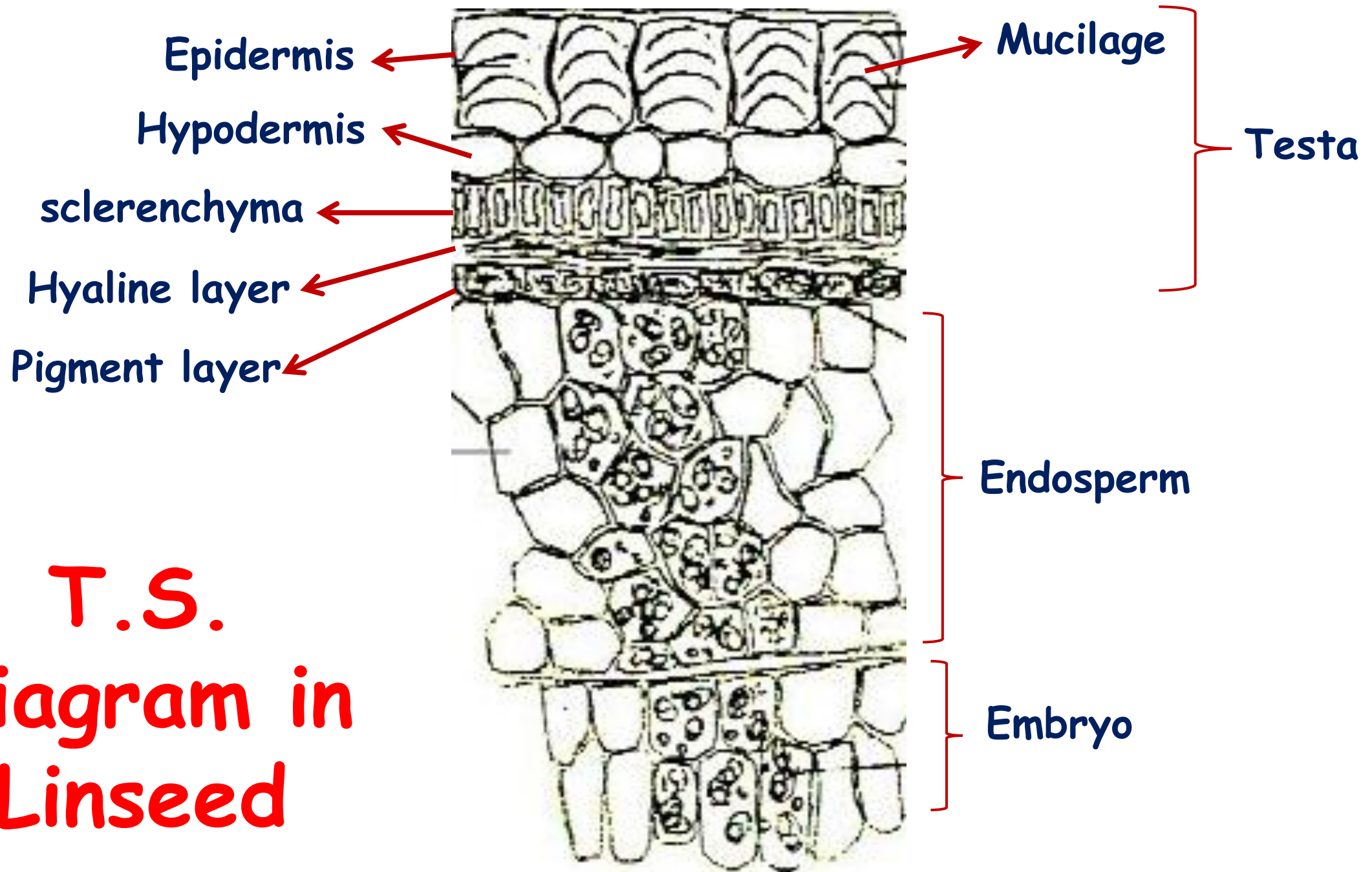


T.S. in linseed

Epidermis ←
Hypodermis ←
Sclerenchyma ←
Hyaline layer ←
Pigment layer ←
Endosperm ←



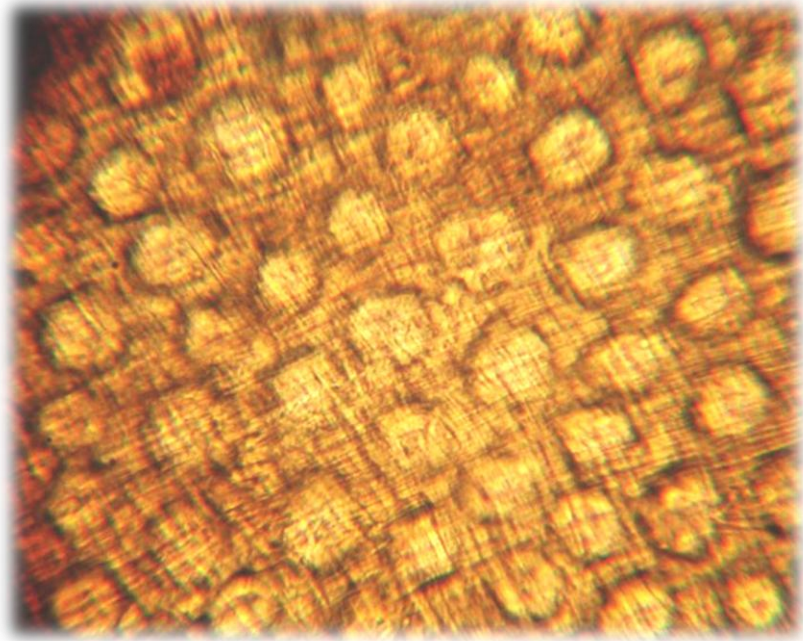
T.S. Diagram in Linseed



Powdered Linseed

- **Color**
Yellowish brown
- **Odor**
Odorless
- **Taste**
Oily mucilagenous

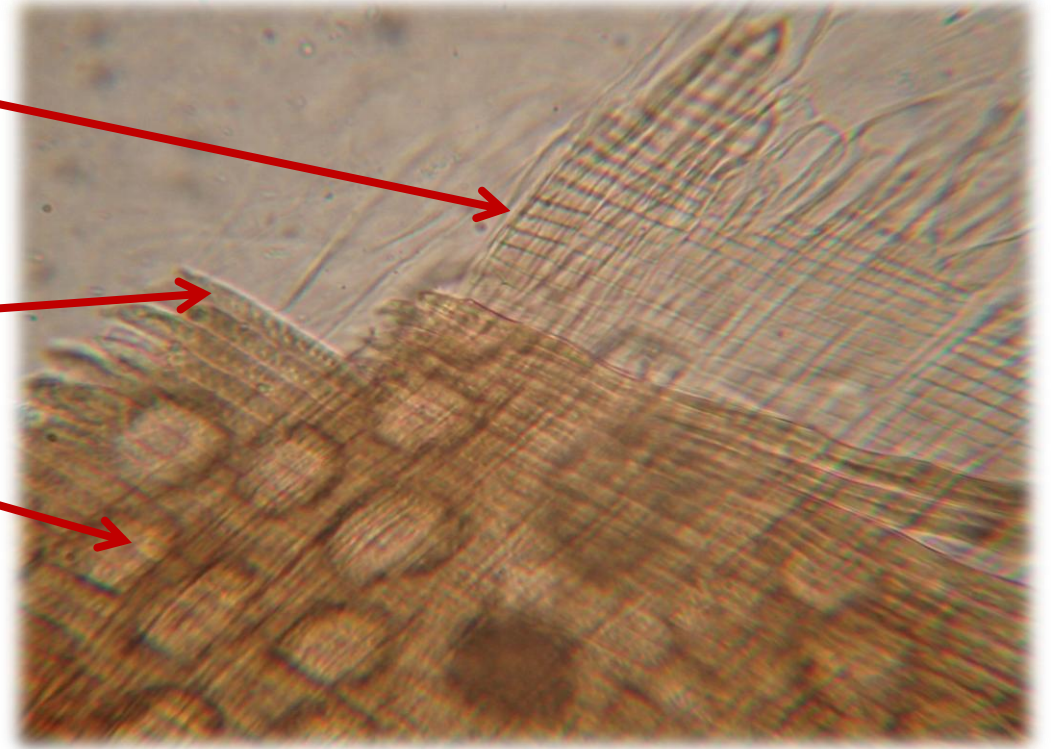
Powdered Linseed



Hyaline layer

Sclerenchyma

Hypodermis



Mat-like structure★



L.P



H.P

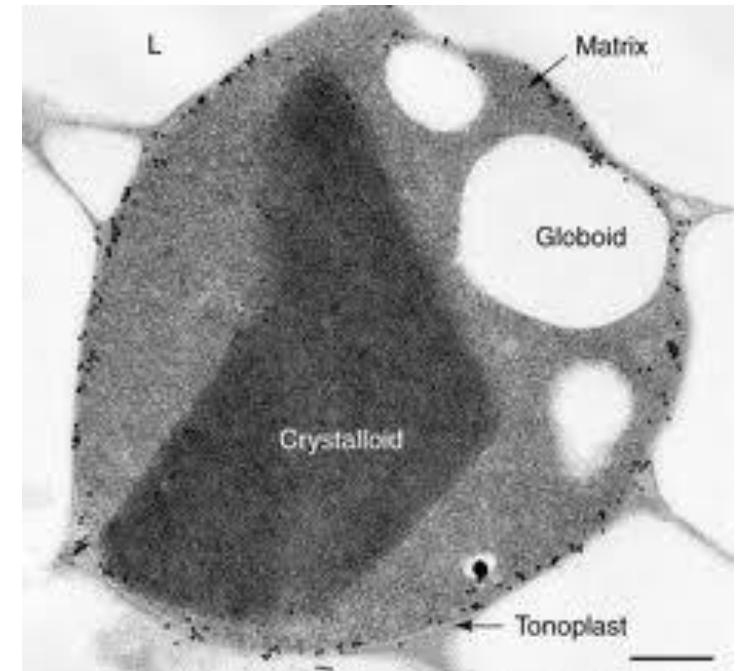
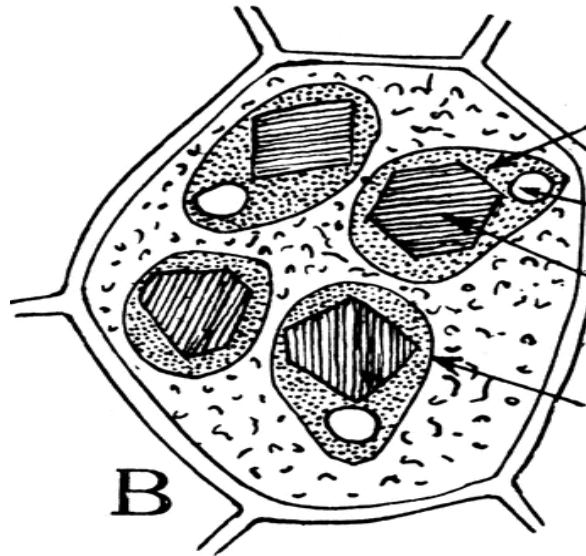
Pigment layer ★
(thick pitted walls)



Fixed oil

Aleurone grain
(globoid & crystalloid)

Embryo



➤ Histochemical Tests

➤ Ruthenium Red
(Mucilage)



Red Stain

➤ Sudan III
(oil)



Red Stain

➤ Picric acid
(Proteins)



Yellow Color

Test for cyanogenic glycosides (Guignard's paper test)



B.W.B. 37°C for 30'



Freshly crushed
linseed + H₂O

Na Picrate
(yellow)

HCN



Na Picramate
(Red)

Department of Pharmacognosy
Faculty of Pharmacy
Cairo University



Seeds Foenugreek



Semen Foenugreek

بذر الحلبة

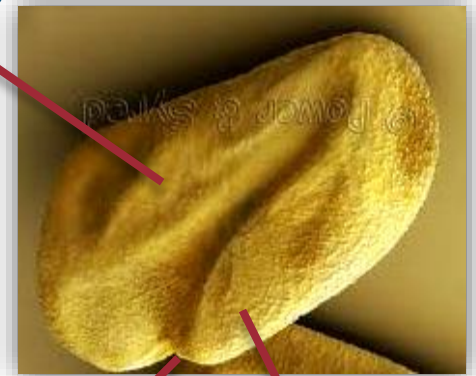
- **Origin:** dried ripe seeds of *Trigonella foenum-graecum* Linne Family Leguminosae.
- **Color:** dark yellowish brown.
- **Odor:** faint characteristic when entire, strong when crushed.
- **Taste:** mucilaginous slightly bitter.



- **Shape:** rhomboidal, flattened with whitish hilum and deep furrow running diagonally dividing the seed into two unequal portions.

Cotyledon
Pocket

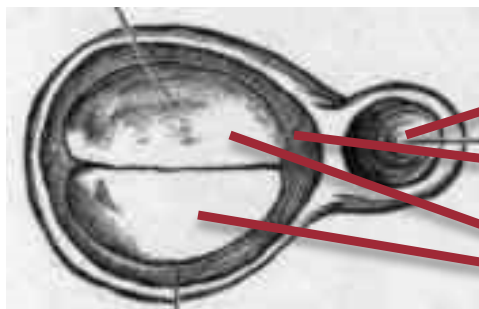
- **Surface:** nearly smooth.
- **Hilum and Micropyle:** present, in the small depression.
- **Raphe :** present ($\frac{1}{2}$ seed)
→ Anatropous ovule.



H. & M.

Radicle
Pocket

- **Outgrowth:** absent.
- **Texture and thickness:** thick and non brittle.
- **Kind:** albuminous.
 - **Perisperm:** absent.
 - **Endosperm:** horny, translucent, surrounding the radicle.

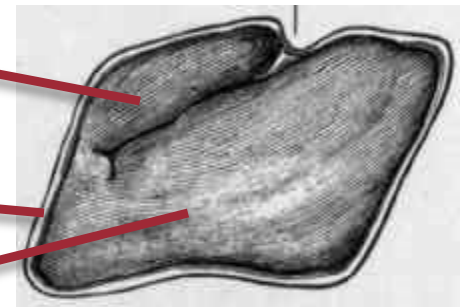


T. Cut

Radicle

Endosperm

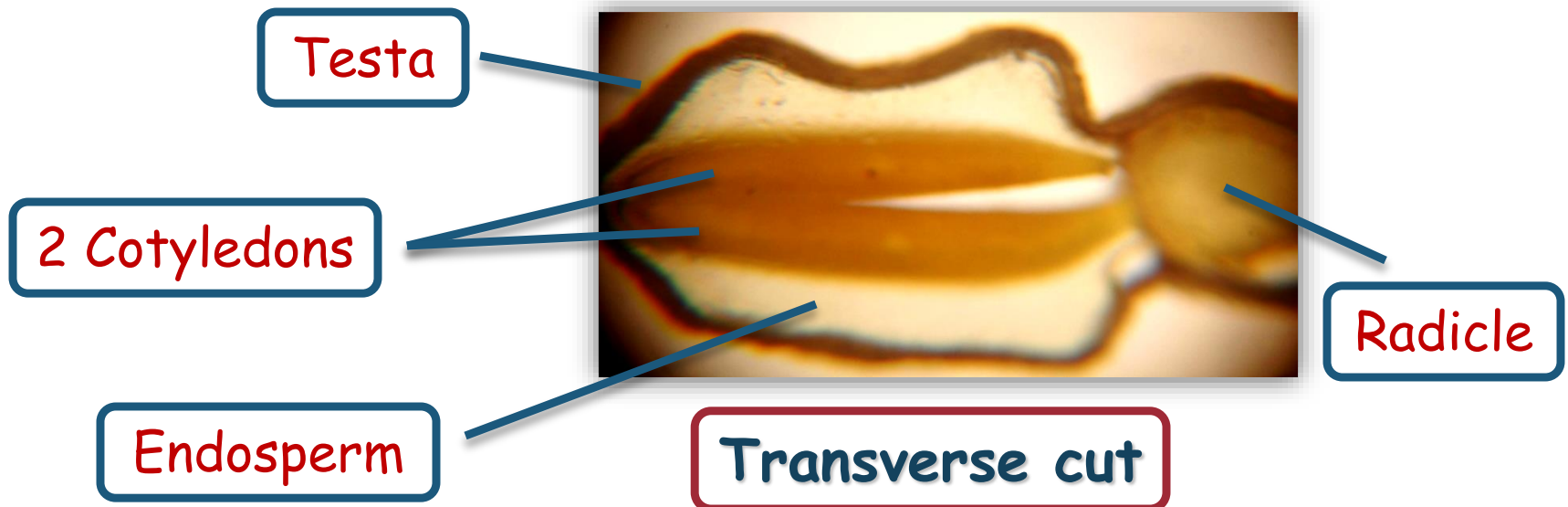
Cotyledons



L. Cut // to surface

Embryo

- **Position:** filling the whole cavity.
- **Form:** accumbent (radicle is bent, facing 2 cotyledons).
- **Cotyledon:** dicot, large in size.
- **Radicle:** present, small in size.

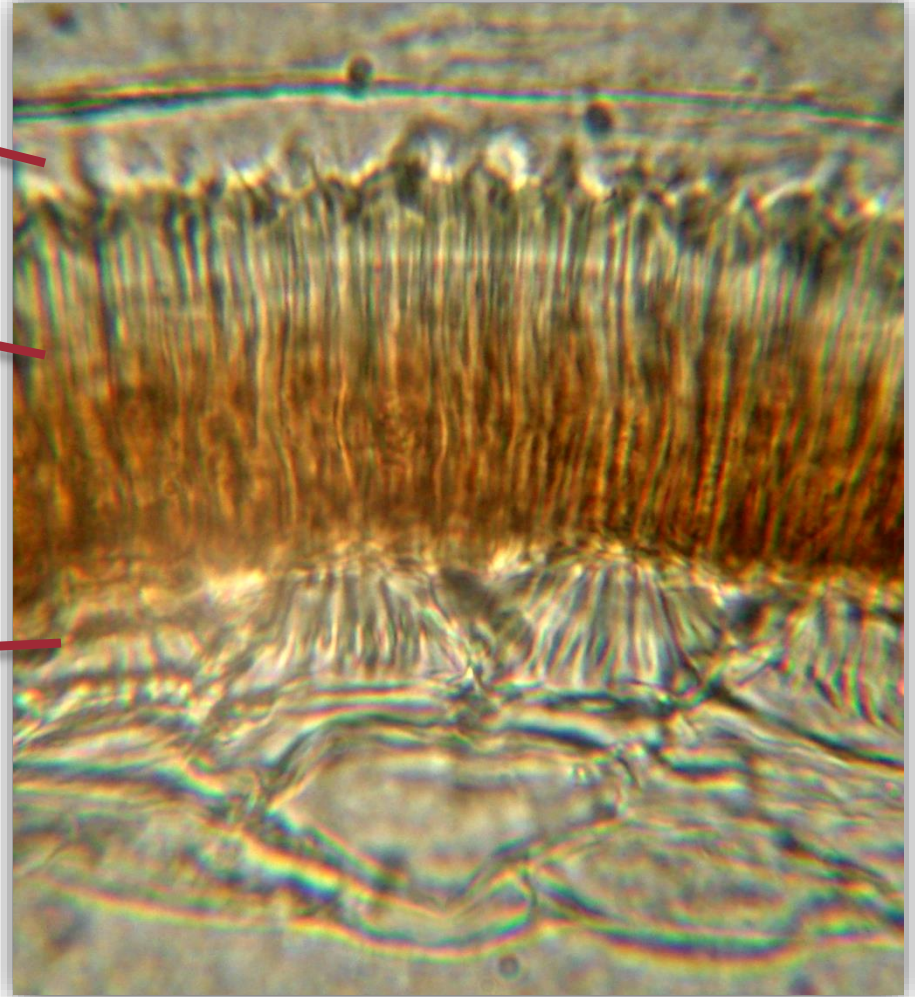


T.S. in Foenugreek (Testa)

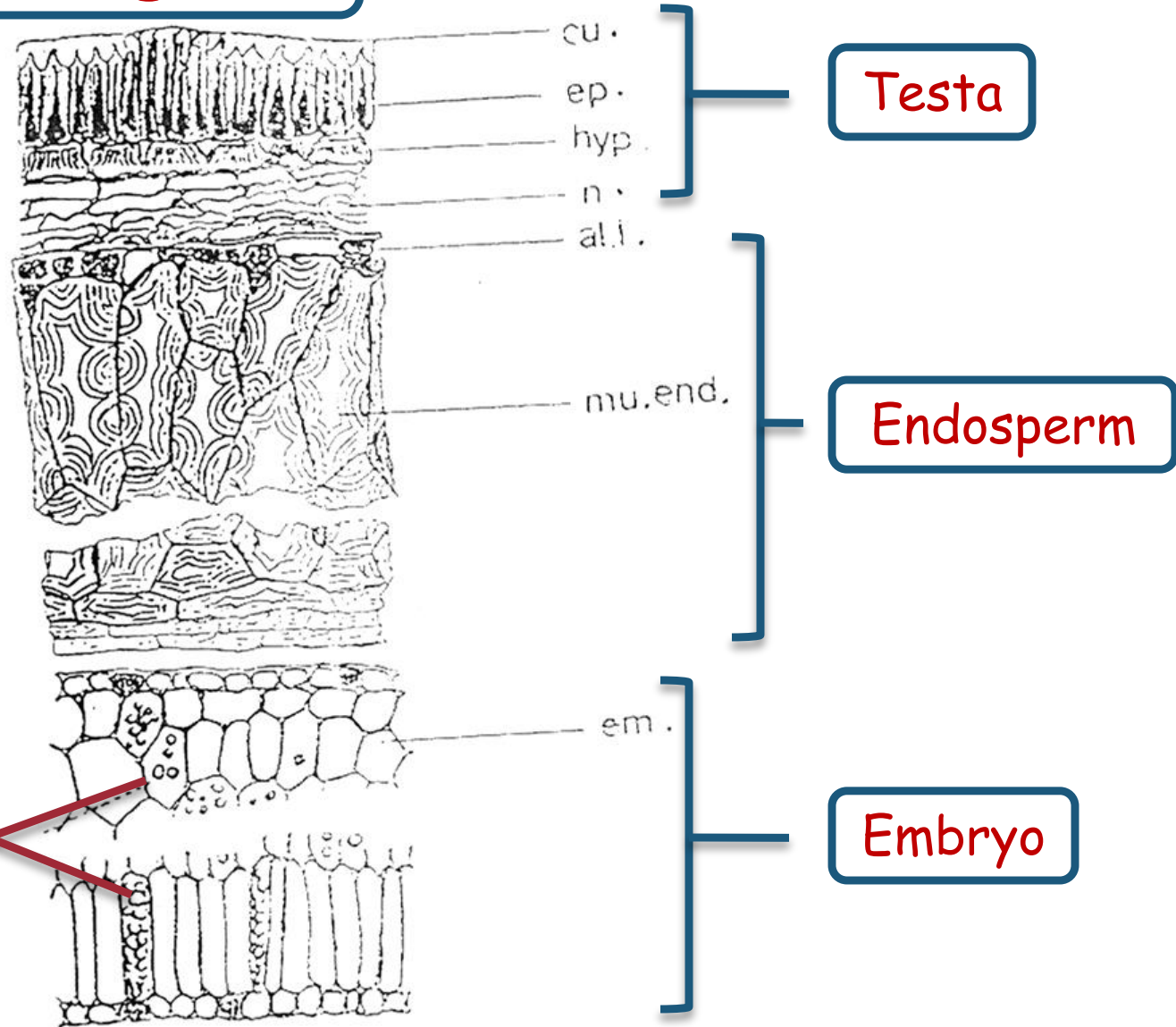
Thick cuticle

Palisade-like
epidermal cells

Basket-like
hypodermal
cells with bar
like thickening
on radial walls



T.S. in Foenugreeek



Foenugreek Powder



- **Color:** yellowish.
- **Odor:** strong characteristic.
- **Taste:** mucilaginous slightly bitter.

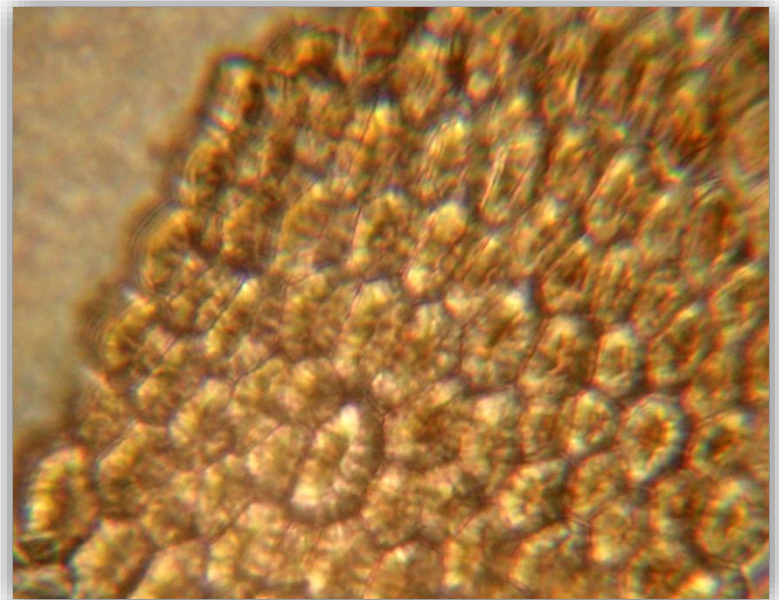
Palisade-like epidermal cells

Side view

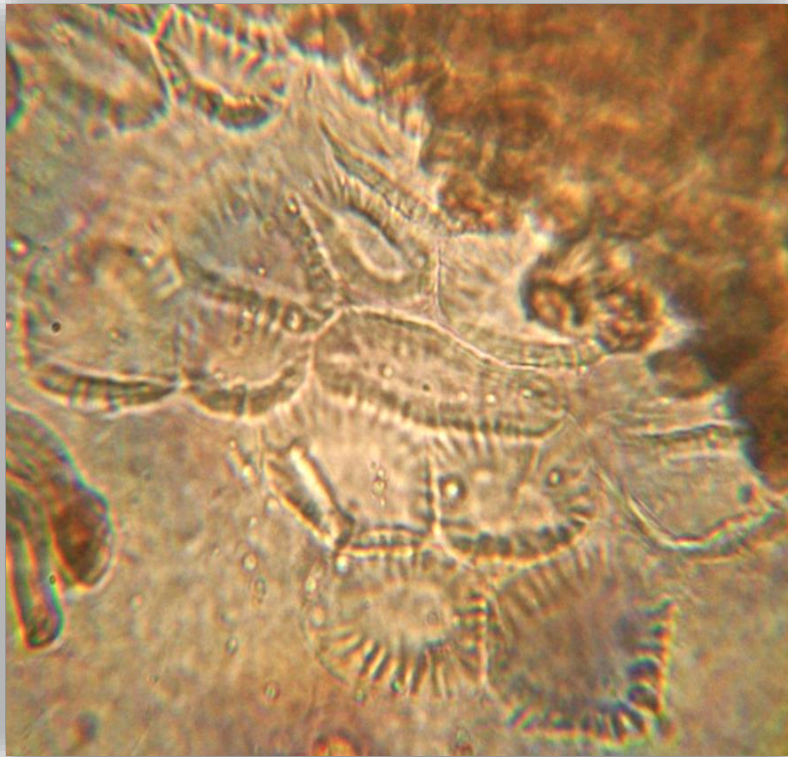


Conical lumen

Basal view



Basket-like hypodermal cells



Surface view



Side view

Special chemical tests

➤ Test for saponin:

Excess powder + H_2O $\xrightarrow[\text{Shake}]{\text{Boil, decantation}}$

Persistent froth for 5 min.

➤ +ve sudan III (due to fixed oil).

➤ +ve methylene blue (due to mucil



Pharmacognosy Department
second year
2015



SEEDS

PSYLLIUM

Psyllium

بذر القاطونة

Origin: dried ripe seeds of *Plantago psyllium*
Family: Plantaginaceae.



Shape :

- Boat shaped , shiny, glossy and transparent
- One convex side (dorsal side) through which the embryo is obvious to naked eye as an extending brown patch.
- One concave side (ventral side) with a deep brown furrow with a pale patch in its center.

**Ventral
Side**

**Dorsal
Side**

Embryo

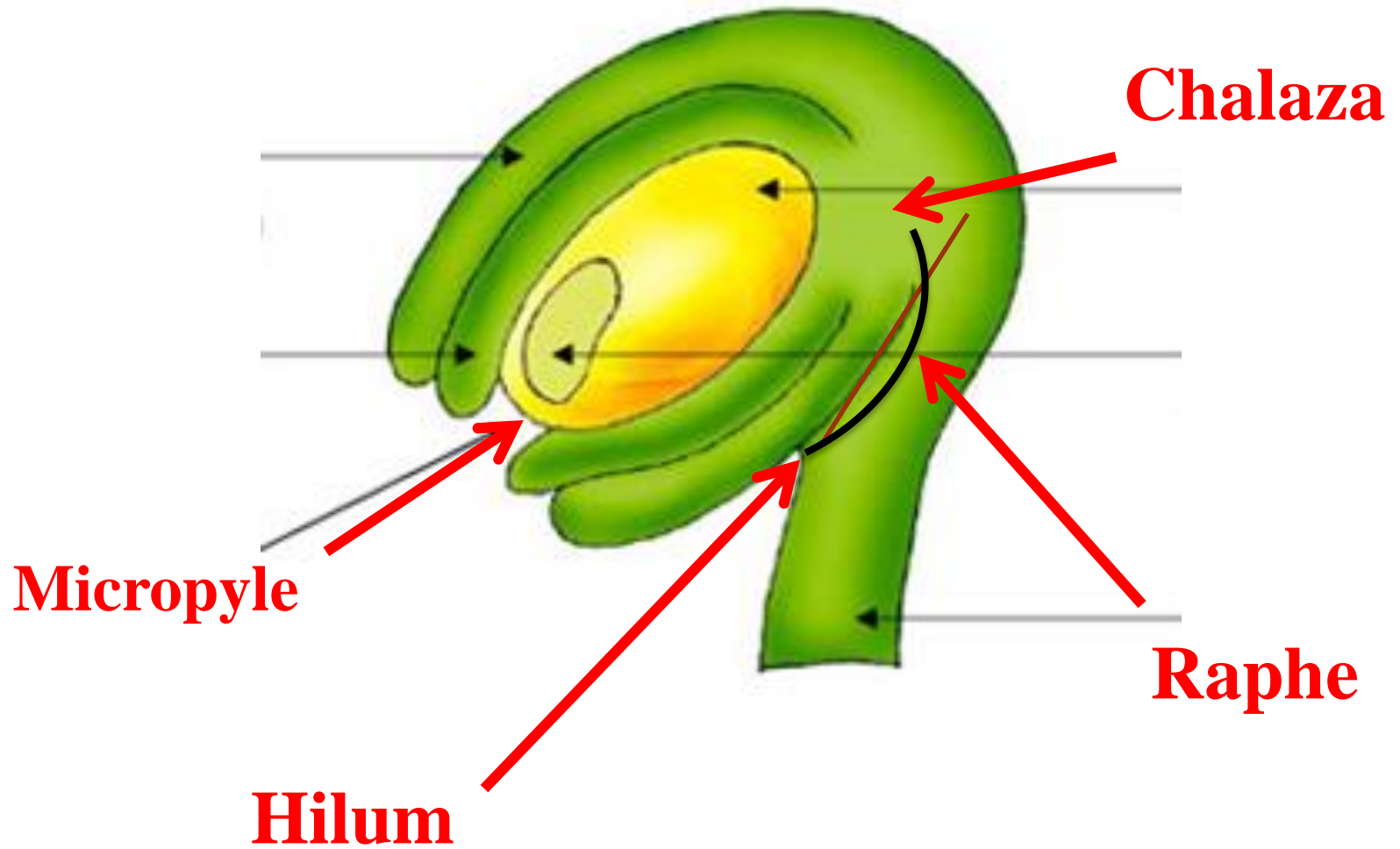


- **Colour** : Faint brown.
- **Odour** : Odourless.
- **Taste** : Mucilagenous
- **Hilum** : in the deep brown furrow in the center of the ventral side.
- **Micropyle** : in the end of the seed.
- **Raphe** : present , extends from the hilum (center) to chalaza and occupies $\frac{1}{4}$ of the seed

Q : Ovule ????

Amphitropous

Amphitropous Ovule



T - CUT in Psyllium seed



Kind : albuminous
endosperm fill most of the seed.

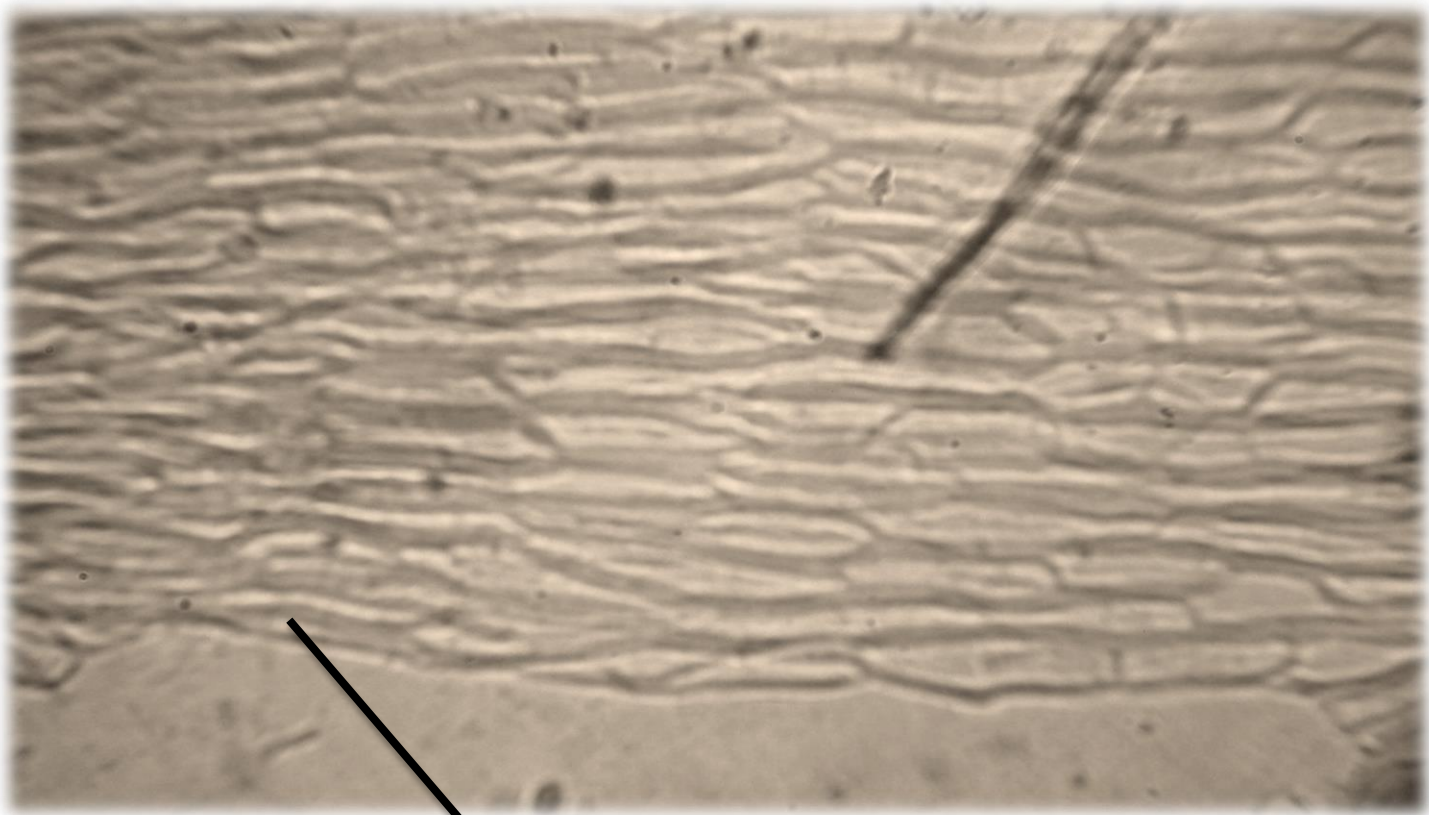
Embryo : straight dicot. Near the dorsal side.

Powder

Colour : Pale brown.

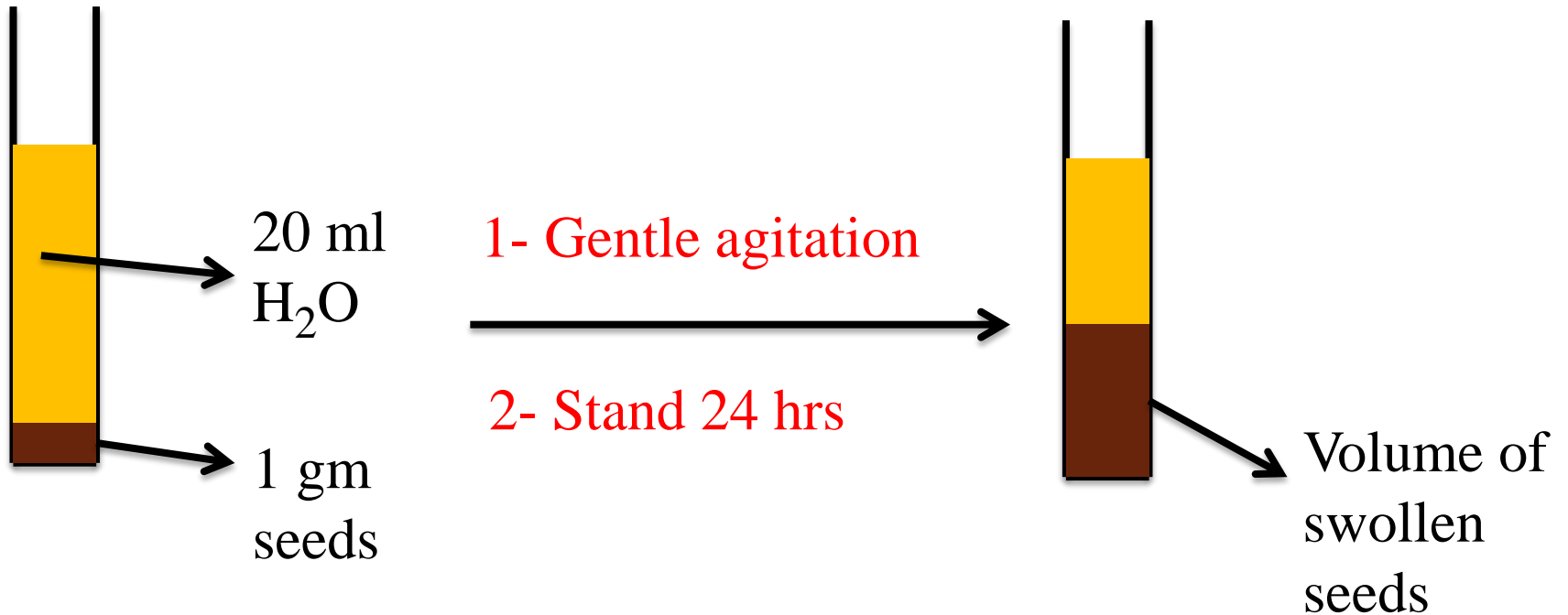
Odour : Odourless

Taste : Mucilagenous



Epidermis of ventral side

Swelling Factor test

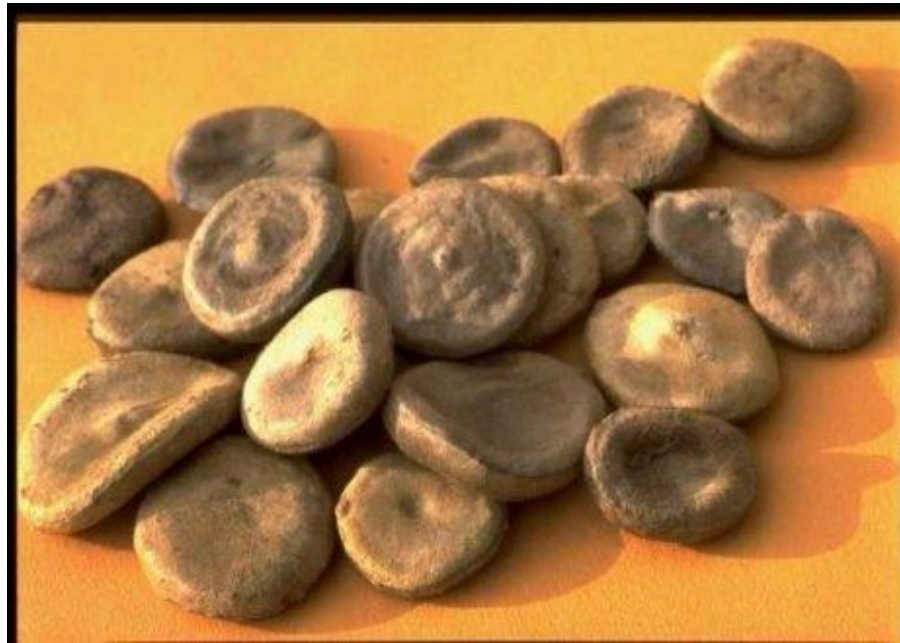


NUX VOMICA

Nux Vomica

بذور الجوز المقيئ

Origin: Dried ripe seeds of *Strychnos nux vomica* Linne family **Loganiaceae**





Shape: Disc in shape , compressed , nearly flat , concave on one side and convex on the other with rounded or acute margin.

Colour : Grey to greenish grey

Odour : Odourless

Taste : persistent intense bitter taste

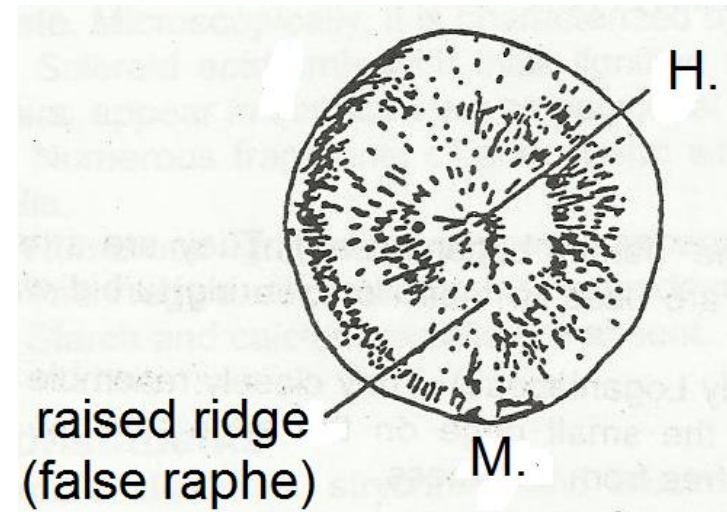
Surface : is satiny sheen (shiny)

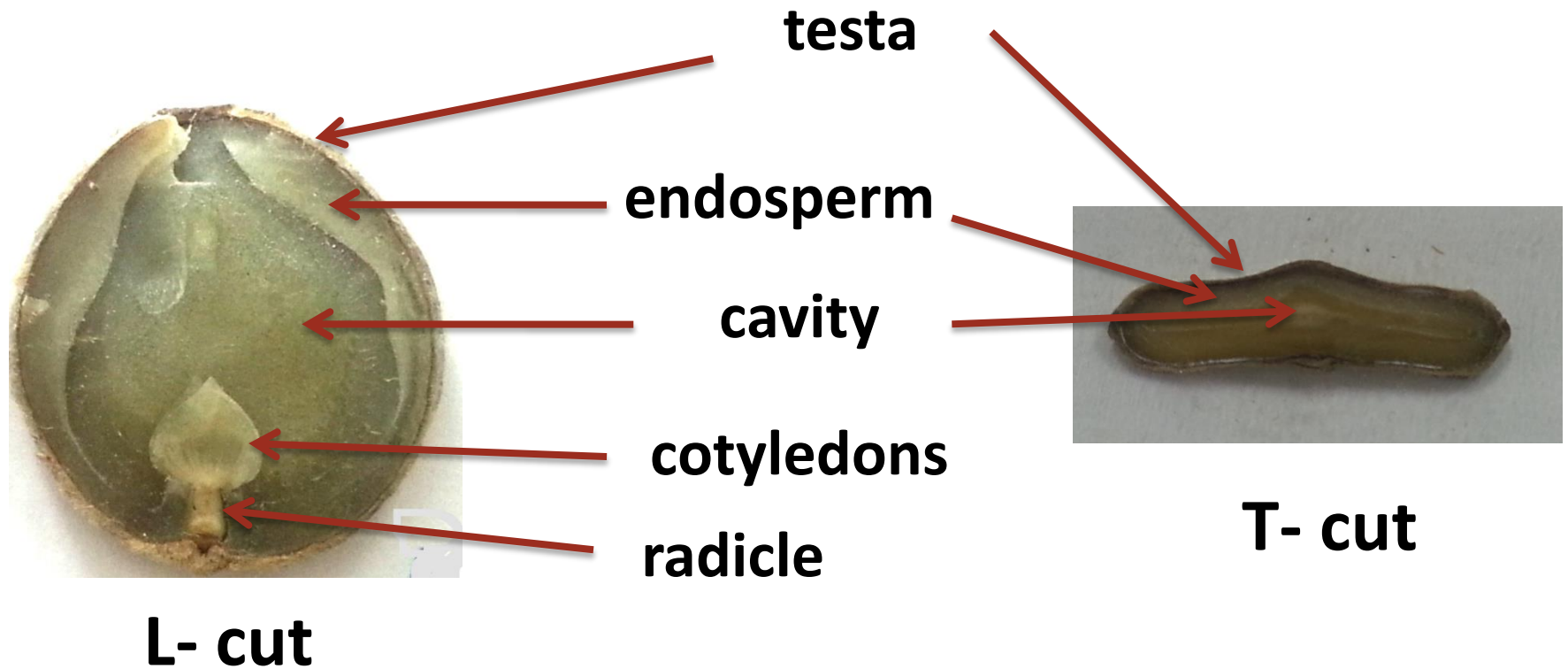
due to the closely appressed hairs radiating from the center to the circumference.

Hilum : raised circular scar in the center of one of the flat sides.

Micropyle : marginal and connected to the hilum by a **raised ridge** (due to crossed hairs).

Raphe : absent.





Kind : albuminous

Endosperm : present , translucent , horny , greyish white

Embryo : straight , basal (marginal) dicot. , small , cordate in shape with small, terete (cylindrical) radicle

Powder

Color : yellowish or brownish grey

Odour : odourless

Taste : persistent intense bitter

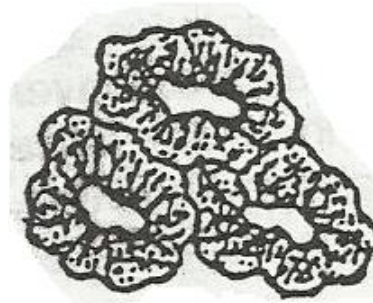
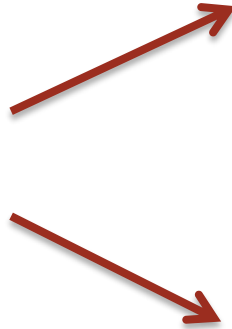


**Pd + phloroglucin +
conc HCL** →



Fragments of epidermal cells

Epidermis
(sclereid)



(T.V.)

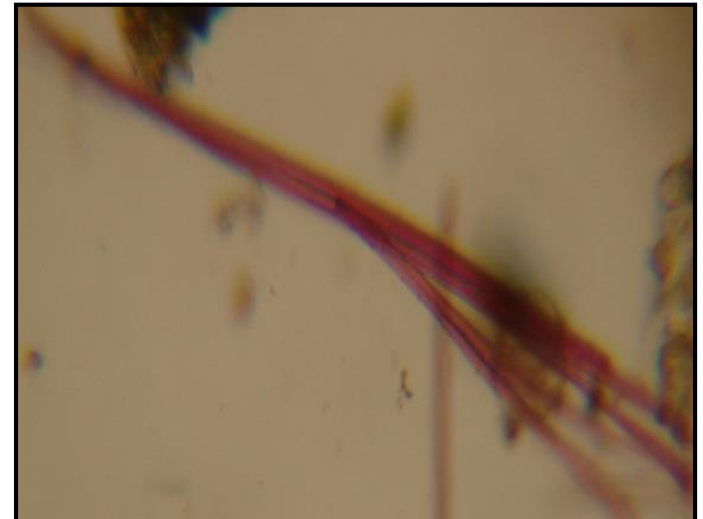
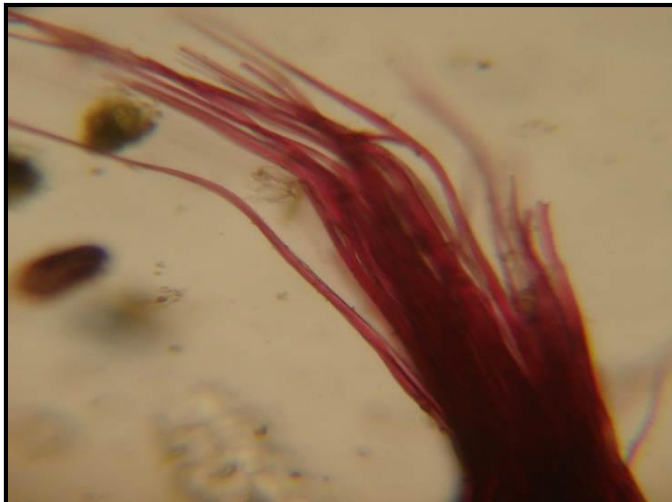
Sinuous polygonal
cells



(S.V.)

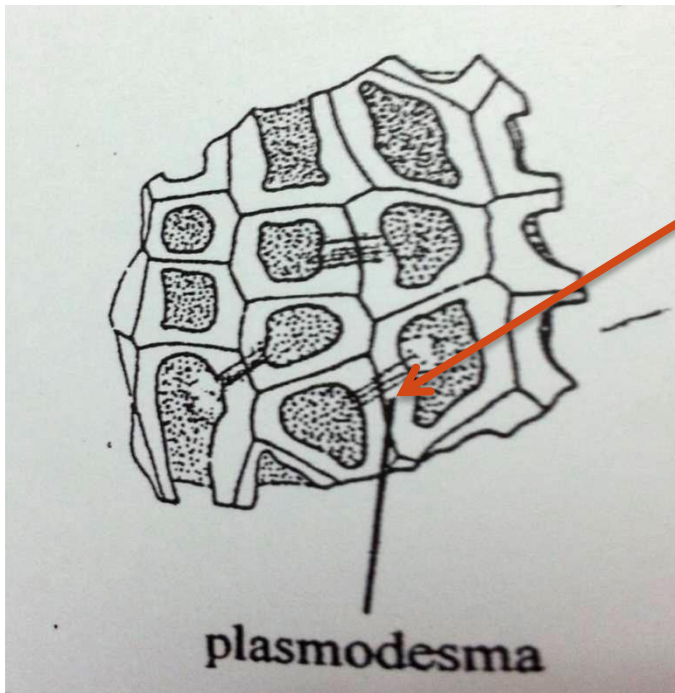
Polygonal cells with
branched lumen
and oblique pits

Lignified ribs



Fragments of endosperm cells:

With thick hemicellulosic
non lignified walls



Plasmodesma

(fine threads connect protoplast
of 2 adjacent cells through cell
walls)

Fragments of embryo cells



Chemical test

Mayer's test :

**Extract + dps of Mayer's reagent
creamy white ppt**

Black mustard and nutmeg



**Cairo University
Faculty of Pharmacy
Department of Pharmacognosy**

Mustard seed

BLACK MUSTARD

- الخردل الاسود
- Origin: dried ripe seeds of

Brassica nigra

Family: Cruciferae



WHITE MUSTARD

- الخردل الابيض
- Origin: dried ripe seeds of

Brassica alba

Family : Cruciferae



Mustard seed

BLACK MUSTARD WHITE MUSTARD

Shape	Spherical or nearly spherical	
Size	Smaller	larger
Color	Reddish brown	yellow
Odour	<ul style="list-style-type: none">- <u>Dry</u> : odourless- <u>Crushed with H₂O</u> : Pungent	No pungent odour even when crushed
Taste	bitter , rapidly becomes pungent	Pungent
Surface	<ul style="list-style-type: none">- Minutely pitted- reticulated	Minutely pitted

Mustard seed

BLACK MUSTARD WHITE MUSTARD

Hilum	Paler in color
Micropyle	Adjacent to the hilum
Raphe	Absent
Kind	???????
Perisperm	
Endosperm	

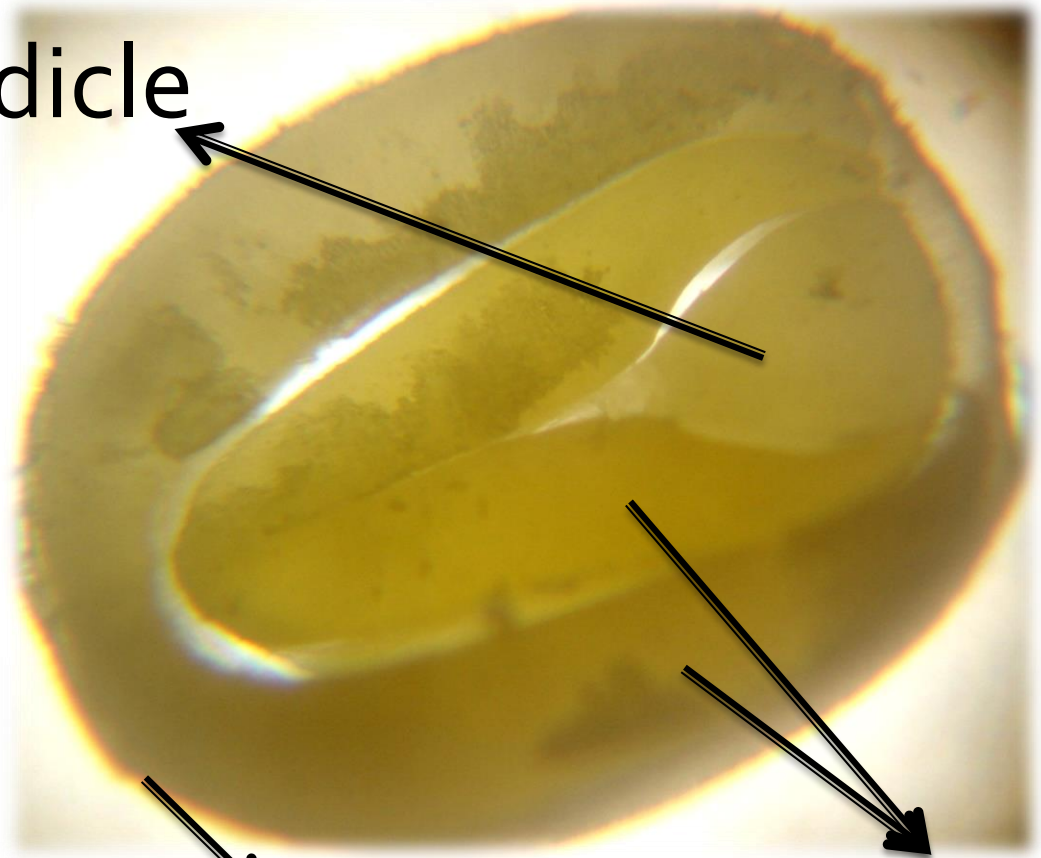
T-Cut in Black mustard

Q : Embryo ???

Orthoplocus



Radicle



Testa

2 cot.

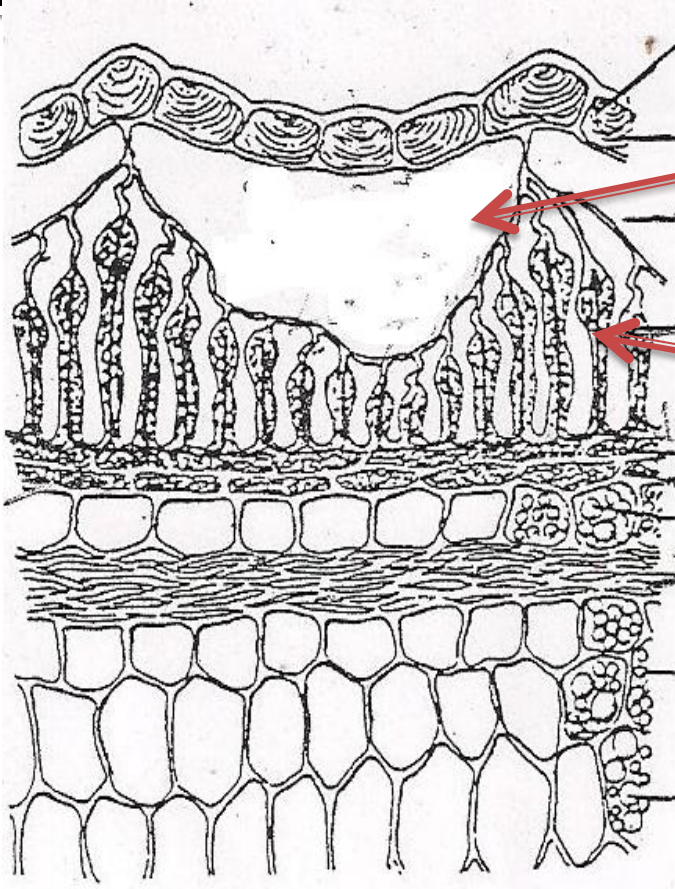
Mustard seed

Q ? Hilum is adjacent to Micropyle and No raphe,
Ovule ?????

Campylotropous



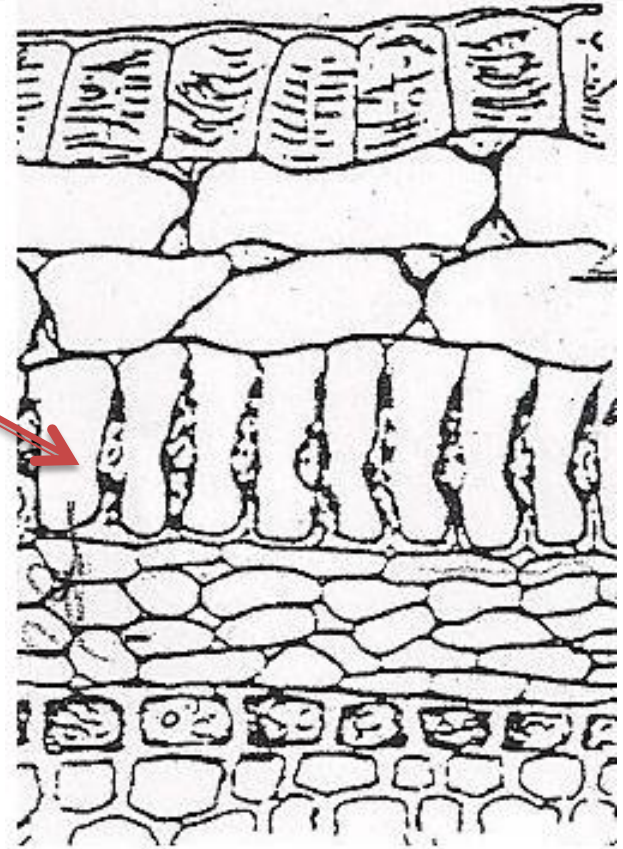
T. S.



Black Mustard

Giant
cell

Scl.



White Mustard

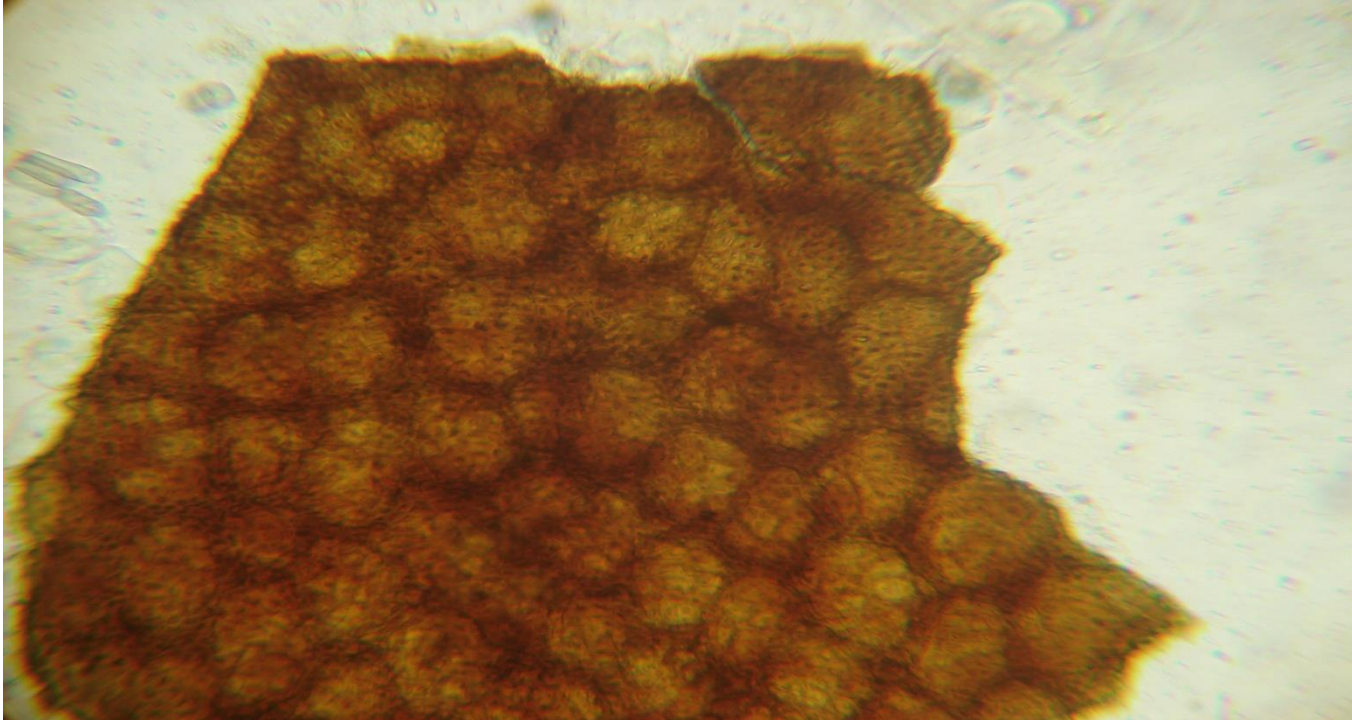
Powder of Black mustard

Colour : Pale brown, or yellowish brown

Odour : slight odour when dry and become pungent with H_2O

Taste : bitter , rapidly becomes pungent

Powder of Black mustard



Network reticulation

Powder of Black mustard



Pigment cells

Histochemical tests

- Sudan III
- Picric acid
- Ruthenium red

Nutmeg seeds

بذور جوز الطيب

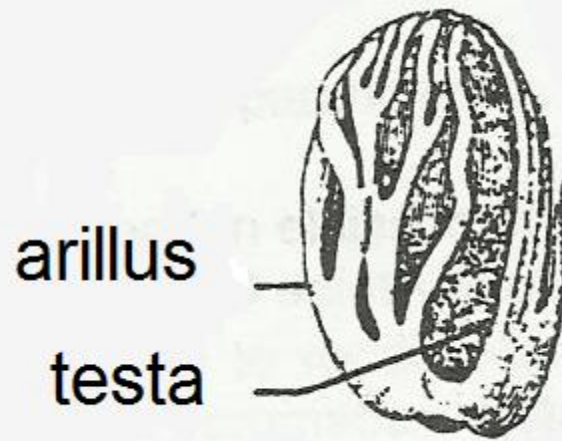


Dried ripe seeds of *Myristica fragrans* Houtt family *Myristicaceae* , deprived of its arillus and testa and with or without a thin coat of lime

Description of the Kernel

- Ovoid with numerous small dark brown points , lines and reticulately-farowed
- Greyish brown color
- Strong aromatic characteristic odour
- Aromatic pungent taste





Removal of testa and arillus



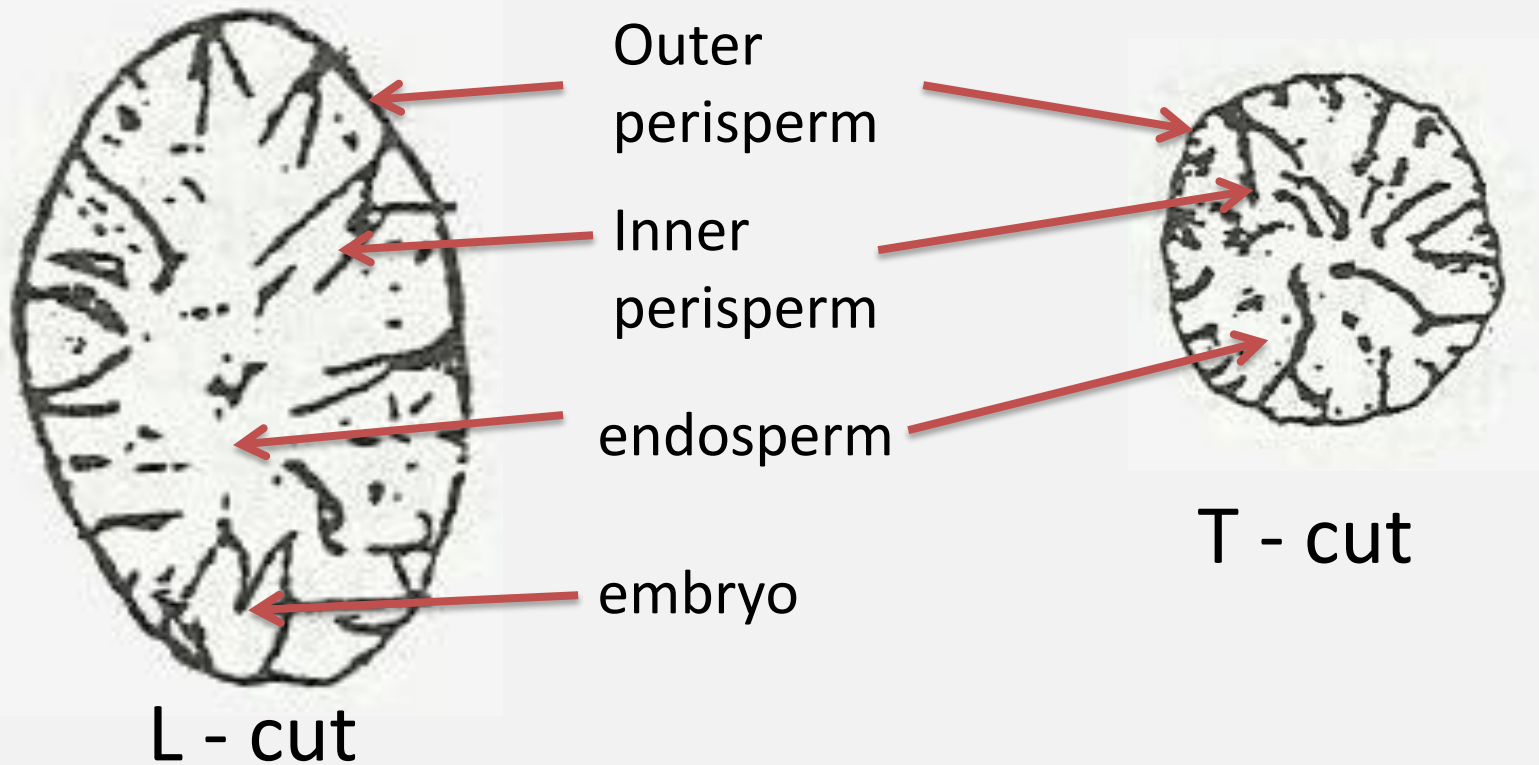
(**Anatropous** !!!)



Position of Chalaza

Groove
(position of raphe)

Position of H. & M.



- Perisperm : present , thin dark brown penetrating to the endosperm giving **marbelled** or **ruminated** appearance
- Endosperm : present , greyish brown

Powdered Nutmeg

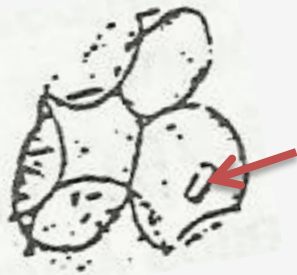
- **Color** : reddish yellow to reddish brown
- **Odour** : strong aromatic and characteristic
- **Taste** : aromatic pungent



outer perisperm

Inner perisperm

vessels



K - acid
tartarate



Oil cell

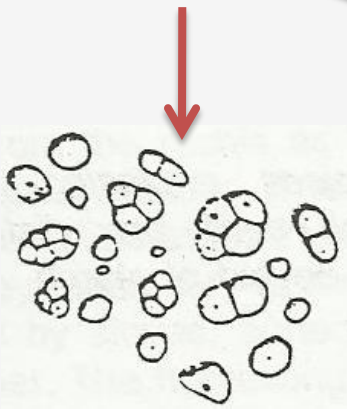


endosperm

Aleurone grain
(**crystalloid !!!**)



Starch granules



Tannin idioblast



Fat crystals !!!!
(50% chloral hydrate)



Fat globule

Histochemical tests ?????

- Sudan III \longrightarrow red (oil globules)
- I_2 \longrightarrow - blue (starch)
- yellowish brown (protein)
- $FeCl_3$ \longrightarrow green color (tannins)